

NBME

13

with answer keys and
explanations

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<http://www.feedurbrain.com/forum/forum.php> . The best medical community site!

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BLOCK 1

- 1- (D) doesn't enjoy being with people, prefers individual activities, indifferent to sexual intimacy → Schizoid
- 2- (F) Uterosacral Ligament is the only structure that extends posteriorly
- 3- (D) young female, neurological symptoms, white matter plaques → Multiple Sclerosis
- 4- (D) Local IL-1 and TNF effects lead to activation of osteoclasts and bone resorption → hypercalcemia
- 5- (E) Ischemia stimulates baroreceptors in afferent arterioles → increased renin
- 6- (F) Cocaine works by inhibiting NE reuptake at the presynaptic terminals
- 7- (D) Post partum hemorrhage, placenta adherent to the uterus, no decidua → Placenta accrete
- 8- (D) NE acts on B1 receptors in the SA node, AV node and cardiac myocytes to increase rate and contractility
- 9- (C) Chronic mal-absorption leading to signs of severe vitamin deficiencies (retinal degeneration, ataxia, motor dysfunction) + acanthocytosis + low cholesterol → abetalipoproteinemia due to Apo B 100 deficiency
- 10- (C) Exposure to paint thinner + ophthalmologic and neurologic symptoms + anion gap metabolic acidosis → probably methanol exposure which is metabolized by Formaldehyde dehydrogenase
- 11- (F) Parasympathetic innervation to the stomach provided by the vagal trunks increases acid output; other choices are all sympathetic
- 12- (C) Inheritance passed by female to 100% of offspring → mitochondrial; variation in symptoms explained by Heteroplasmy



- 13- (D) CRF in middle age + family history + bilateral abdominal masses→ Polycystic kidney disease
- 14- (A) Long-term heavy smoker, painless hematuria→ most probably Bladder Cancer
- 15- (B) Abdominal pain, nausea, vomiting short time after eating pastries + no fever→ Enterotoxin ingestion
- 16- (C) Chronic transplant rejection carried out by CD8+ T cells is due to Direct cytotoxicity to graft cells
- 17- (B) Withdrawal symptoms of Heroin include hyper-excitability and increased sympathetic discharge
- 18- (A) History of hypercoagulability and miscarriage + prolonged PTT→ Antiphospholipid antibody syndrome
- 19- (B) Interferon- γ receptor deficiency leads to defective intracellular killing of mycobacteria by macrophages
- 20- (F) All symptoms suggestive of scleroderma which leads esophageal fibrosis→ decreased peristalsis and LES tone.
- 21-
- 22- (H) HSV becomes protected from immune response by establishing a latent infection in the sensory nerve cells, in case of genital herpes in the dorsal root ganglia of the lumbar or sacral plexus.
- 23- (E) The most common cardiac tumor in adults, in addition to being a famous source of embolism is myxoma, usually in the left atrium
- 24- (A) The clinical picture is suggestive of tetanus poisoning due to wound infection by clostridium tetani, the toxin works by inhibiting the release of the inhibitory neurotransmitter glycine in the spinal cord leading to disinhibition of the motor nerve cells
- 25- (A) The clinical picture is suggestive of Cushing disease due to increased ACTH secretion by pituitary adenoma leading to hyperplasia of the cells in the zona fasciculata of the adrenal glands
- 26- (A)The antibody worked by blocking the tumor receptor on the surface of hepatocytes, preventing tumor cells from homing to the liver cells



27- (D) Absence of blinding in the study created an observer bias which led to variability in outcome assessment

28- (C) The patient is clearly affected by the severity of his pain, he hasn't attempted suicide on his own so I think restraining him wouldn't be of benefit, reevaluating him after controlling the precipitating factor (i.e. the pain) would be the best option

29- (D) The patient's behavior is strongly related to instances in which she becomes separated from her mother which can be considered normal behavior only between 12-18 months of age, in addition no signs of defiant or criminal behavior to justify oppositional defiant or conduct disorders, respectively.

30- (E) Variation in phenotype between individuals carrying the same genotype defines variable expressivity

31- (E) Acetazolamide acts by inhibiting bicarbonate reabsorption and hydrogen ion secretion in the proximal tubule

32- (E) The photograph shows a collection of blood vessels of abnormal shape in the medial side of the brain, together with the history of seizures this is suggestive of congenital vascular malformation

33- (D) History of amenorrhea and infertility + obesity + hirsutism → polycystic ovarian syndrome

34- (A) Micafungin, like capsosfungin, works by inhibiting carbohydrate synthesis in the fungal cell wall

35- (B) The patient's diet rules out dietary deficiency as a cause, besides there is a high incidence of other autoimmune disorders in patients who have autoimmune thyroiditis, among those is pernicious anemia

36- (A) Ligaments, like cartilage are avascular and therefore lack of good blood supply would slow down the healing process

37-

38- (D) History and symptoms are suggestive of heart failure, the presence of lowered PO₂ indicates respiratory insufficiency which in case of heart failure is commonly caused by pulmonary edema

39- (A) The presence of alveolar hyaline membranes is indicative of ARDS which is the only acute process involving diffuse alveolar damage, the other choices all indicate a chronic process

- 40- (D) The HSG shows a malformed unicornuate uterus which is caused by the dysgenesis of the paramesonephric ducts
- 41- (A) The lab findings show hyponatremia and decreased plasma osmolality and increased urine osmolality indicative of hypersecretion of ADH
- 42- (C) Warfarin causes a decrease in factors II, VII, IX, and X, its toxicity can be treated by vit. K in mild cases and fresh frozen plasma in severe cases
- 43- (C) The photo shows gram positive bacilli, the only one from the choices that fits the description is *Listeria*
- 44- (C) Left sided numbness and paralysis that are more severe in the face and upper limb → middle cerebral artery infarction
- 45- (D) Since the neurovascular bundle runs in the lower part of the rib all the choices with "below" can be ruled out. The only left choice that's below 7th rib is (D). In addition thoracentesis should be done between 8th and 10th ribs to avoid lung injury
- 46- (A) The presence of adhesins (pili) aids the bacteria in adhering to the urinary tract epithelium and withstanding the urine flow
- 47- (D) $LD = Vd \times C_{ss} = 8 \times 0.35 = 2.8 \text{ mg/kg} \times 55 \text{ kg} = 154 \text{ mg}$
- 48- (C) The most beneficial drug in hepatic encephalopathy is lactulose, works by trapping ammonium in the intestines.
- 49-
- 50- (F) The case indicates nephrogenic DI, the proximal tubule is always isotonic. The ADH works on the distal tubule and collecting ducts, when its action is blocked the osmolality inside these regions will be hypotonic

BLOCK 2

1. D - Cephalixin like all other b-lactams works by inhibiting bacterial cell wall synthesis (FA 12 – pg 206)
2. A – hyperglycemia – epi/glucagon > adenylyl cyclase > glycogen phosphorylase > break down of glycogen (FA 12 – pg 114)
3. B - In hereditary hemochromatosis, dysregulation of intestinal iron absorption occurs, wherein iron continues to be efficiently absorbed even in the face of substantial elevation of body iron stores (<http://emedicine.medscape.com/article...overview#a0104>)



4. **A** – A long duration of inactivity + pleuritic chest pain is typical for pulmonary embolism. In PE, the problem lies with perfusion, because blood flow to the lung is blocked by the embolus. Ventilation is not altered by the embolus, so it remains normal. Therefore, V/Q ratio is infinite. Non-perfused, but ventilated areas are called as "dead space".
5. **B** - Cisplatin works by cross-linking DNA (FA 12 – pg 401)
6. **C** – abdominal pain radiating to back – AAA > Tachycardia and hypotension means Aortic rupture (FA 12 – pg 295)
7. **No question**
8. **B** – Seratus anterior muscle > Long thoracic N > winging of scapula (FA12 - pg 411)
9. **C** – MM --> tenderness in back, proteinuria, slide showing plasma cell with clock face chromatin (FA 12 – pg 391)
10. **A** - Unilateral headache and tearing and rhinorrhea + symptoms occur regularly every day at the same time and at same period over years --> cluster headache (FA 12 – pg 467)
11. **A** – Apoptosis > hint fragmented nuclear chromatin, cytoplasmic bleb (FA12 – pg 244)
12. **C** - The woman's history is suggestive of atherosclerosis, which is a risk factor for ischemic colitis, in addition the splenic flexure is a "watershed area" between the middle and left colic arteries and is most commonly affected in cases of ischemic colitis (FA 12 – pg 358)
13. **C** - Homologous pairing is essential for crossing over, in which homologous chromosomes exchange segments with each other during meiosis 1, this is necessary for genetic variation
14. **B** - Typical case of Goodpasture's syndrome in which antibodies attack basement membranes, causing crescentic glomerulonephritis with linear immunofluorescence and alveolar damage (FA 12 – pg 516)
15. **D** - Old age, left lower quadrant pain, fever + typical CT scan findings--> diverticulitis (FA 12 – pg 356)
16. **E** - Since the antigen was a polysaccharide it generated only a B cell response which led to only IgM production. IgG response requires isotype switching from IgM which depends on T cell stimulation to B cells, T cells in that case were not stimulated because



they recognize only protein antigens not polysaccharides.

17. **B** - The reason for increased risk of gastric adenocarcinoma in the Japanese population is the carcinogens present in the diet, the patient continued consuming the same diet after his arrival. it's definitely the nitrosamines in smoked food and Japanese background. (FA 12 – pg 354)

18. **C** - Overdosage of neostigmine caused desensitization of the nicotinic receptors at the motor end plate. MG is due to autoimmune “deactivation” of nicotinic receptors, so choice A and other choices involving muscarinic receptors can be ruled out. (FA 12 – pg 265)

19. **(D)** Hand cleansing is generally the most important and effective measure in preventing nosocomial infections.

20. **E** – Praziquantel - increases the permeability of the cell membranes to calcium, causing paralysis, dislodgement, and death of the parasite (<http://en.wikipedia.org/wiki/Praziquantel>)

21. **B** - Elbow flexion is done mainly by the biceps and brachialis muscles, both supplied by the musculocutaneous nerve. (FA 12 – pg 409)

22. **D** - Imprinting in that case caused Prader-Willi syndrome because he inherited the defective chromosome from his father, while his cousin has Angelman syndrome because she inherited that chromosome from her mother (FA 12 – pg 87)

23. **E** - As the stimulation frequency increases the amount of calcium released from the sarcoplasmic reticulum increases, and so the amount of calcium sequestered in order to be able to release a greater amount of calcium with each successive contraction. (<http://cvphysiology.com/Cardiac%20Function/CF022.htm>). The first one is when you have the most calcium in the SR. When you get to the later ones with just a huge continuous contractile spike (tetanus), less calcium is in the SR and more calcium is in the cytosol.

24. **D** –

A neutral risk is 1.

A is an absolute, so it's pretty silly and is wrong. B is also another absolute.

RR <1 means exposure reduces relative risk of getting the disease.

RR >1 means exposure increases relative risk of getting the disease.

Selenium correlates with lower risk of gastric cancer (FA12 – pg54)

25. **D** - Premature baby with respiratory distress + typical findings on CXR--> neonatal RDS due to surfactant deficiency. (FA12 – pg 569)

25. Correct answer is D. The newborn is on respiratory distress (cyanosis and rib retraction). There are many causes of RD, which could be pulmonary and non-pulmonary. But there are two findings, which suggest the diagnosis of Respiratory Distress Syndrome (also known as Hyaline Membrane Disease), premature birth (34 weeks gestation, the normal range is 38 – 42 weeks) and the reticulogranular appearance on x ray. RDS is caused by a lack of surfactant, which is normally produced by the type II pneumocytes. The role of surfactant is to reduce the surface tension on the alveoli and prevent them from collapsing during exhalation.

26. Correct answer is E. MPO is found in the azurophilic granules of neutrophils. In the presence of a halide such as Cl^- , converts hydrogen peroxide to hypochlorite, which is a very potent antimicrobial agent. MPO deficiency is usually asymptomatic or less commonly it presents with recurrent yeast (candida albicans) infections, but in our case the likelihood of developing yeast infections increases since the patient is diabetic.

27. Correct answer is B. Compression sleeves also known as lymphedema sleeves are used in the initial management of lymphedema. Application of heat would exacerbate it and diuretic usage is of little benefit and would lead to volume depletion.

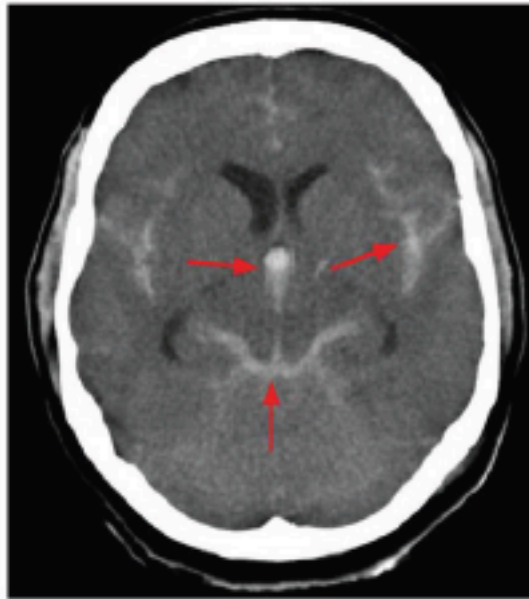
28. Correct answer is C. The lab results show normochromic (MCHC within normal range) normocytic (MCV within normal range) anemia (low Hb and Hct) on a patient with chronic renal disease (high creatinine and BUN) due to diabetic nephropathy. The cause of anemia is the lack of EPO which is normally produced in the kidneys in response to hypoxia, therefore the best approach to this patients is to administer EPO.

29. Correct answer is D. This girl suffers from Minimal Change Disease, which the most common cause of nephrotic syndrome (suggested by puffy eyes, 3+ proteinuria, no red cell casts) in children, typically after a respiratory infection or immunization. MCD is characterized by the effacement of the foot processes of the podocytes and loss of negative glomerular charges

31. Correct answer is D. Voltage-gated Na channels since they are responsible for the depolarization during an action potential and the propagation of it

32. Correct answer is B.

33. Correct answer is D. "Worst headache of my life" with nuchal rigidity strongly suggests Subarachnoid hemorrhage, although we should bear in mind that headache with nuchal rigidity may also present as sign of Meningitis. CT scan shows bright white areas in the center and along sulci, which are consistent with SAH.



34. Correct answer is B. Agitation and sings of sympathetic hyperactivity (tachycardia, pupillary dilation and diaphoresis) suggest amphetamine abuse. Amphetamine acts by inhibiting the reuptake of Norepinephrine and stimulating the release of dopamine both of which have stimulating effects.

35. Correct answer is D. Tense bullae developing at the dermal-epidermal junction suggest Bullous Pemphigoid. BP is an autoimmune disease caused by circulating IgG directed against Bullous Pemphigoid Protein 1 and 2 (BPAG2 is also known as type XVIII collagen), which are transmembranous hemidesmosomal proteins.

36. Correct answer is E. Immotile sperm cells suggest Kartagener syndrome. KS is an AR disease characterized by the presence of defective dynein or absence of it. This will lead to decreased mucociliary clearance with chronic sinusitis, and bronchiectasis, and other pathologic findings like reduced sperm motility and situs inversus

37. Correct answer is D. Immunohistochemistry positive for synaptophysin, chromogranin and neuron-specific enolase along with the EM findings suggest a neuroendocrine origin of this mass. The slide given shows cells organized in nests (Zellballen) separated by septa, which are consistent with paraganglioma (carotid body tumor).



38. Correct answer is B. The clinical findings of this patient are consistent with diffuse bronchopneumonia. The most common causes of BP in CF patients are, *Staphylococcus aureus*, *Haemophilus influenza* (non-typeable), *Pseudomonas aeruginosa*, *Burkholderia cepacia*. Aerobic, gram -, oxidase positive, non-lactose fermenter bacteria that produces pyocyanin, is most likely *P. aeruginosa*. Strains of *P. aeruginosa* isolated from CF patients produce in high amounts alginate (an exopolysaccharide) which provides the matrix for these bacteria to live in a biofilm (an aggregate of bacteria). Biofilm act as a diffusion barrier, but also some of the bacteria within the biofilm show markedly resistance to the antimicrobial agents, that's why it's difficult to treat these patients.

39. Correct answer is E. Type II pneumocytes, polygonal shaped cells, represent 60% of the epithelial cells lining the alveolar surface, but cover only 10% of it. The free surface of these cells is covered by microvilli and the cytoplasm displays dense membrane-bound lamellar bodies representing secretory granules containing pulmonary surfactant. In addition to the secretion of surfactant type II pneumocytes play also a role in the repair of the epithelial lining of the alveoli.

40. Correct answer is E. Volume depletion has caused a decrease in renal perfusion, in turn renal perfusion has led to acute tubular necrosis, which is suggested by the lab values, Urine Osm < 350, Urine sodium > 40 and FeNa+ > 1%. In ATN the BUN/Cr ratio is expected to be < 10:1, but in our case its approx. 23:1, this is explained by the GI bleeding the protein load on the GI. After restoring perfusion to the kidneys it will take 1-2 weeks for the epithelium of the renal tubules to regenerate.

41. Correct answer is C. The bronchial arteries branch from the aorta to supply the bronchi and pulmonary connective tissues with nourishing, they receive 0.2–1.9% of the CO meanwhile pulmonary circulation receives all of it.

42. Correct answer is C. First step in the management of this patient is to rule out a possible pregnancy (childbearing age with no menses for two months and blue tinged vaginal mucosa) which can be done by measurement of urinary bhCG

43. Correct answer is A. Because its an open-ended questions.

45. Correct answer is E. Proteins that are to be degraded are first tagged by conjugating them with Ubiquitin and these tagged proteins are then recognized and shuttled to the proteasome for degradation

46. Correct answer is F. Liver disease is associated with impaired estrogen metabolism resulting in hyperestrogenemia. Hyperestrogenemia will lead to hypogonadism (decreased testosterone) which on the other hand will cause decreased libido and erectile dysfunction.

47. Correct answer is D. The decrease in circumference caused by atrophy (in this case its called disuse atrophy due to prolonged immobilization). There two mechanisms which underlie atrophy, decreased protein synthesis and increased protein degradation by ubiquitin-proteasome pathway.

48. Missing



49. Correct answer is E. 95% of acetaminophen is detoxified by the phase II enzymes and excreted in urine as glucuronate or sulfate conjugates, about 5% is metabolized by CYP2E in NAPQI (N-acetyl-p-benzoquinoneimine), which is a highly reactive substance. NAPQI is detoxified by GSH. Alcohol will induce CYP2E and increase the fraction of acetaminophen metabolized in NAPQI, this in turn will decrease the level of GSH making the cells more susceptible to ROS injury, also NAPQI can damage directly cellular components.

50. Correct answer is B. This is a case of unexplained infertility (idiopathic), diagnosis of which is made by excluding, anovulation, tubal disease and semen problems. The initial treatment to these patients is with clomiphene and IUI (Intrauterine insemination). Clomiphene acts as a partial estrogen agonist. It has been shown that clomiphene inhibits stronger estrogens negative feedback on the secretion of gonadotropins, enhancing the release of them. By doing so it stimulates ovulation.

BLOCK 3

- 1. D- Pili-** The dominant virulence factors of *Neisseria gonorrhea* are pili (fimbriae) and the production of lipopolysaccharide endotoxin. FA 2012 162
- 2. A- Activation of nuclear gene transcription-** Tretinoin, also known as all-*trans*-retinoic acid (ATRA), is a naturally occurring derivative of vitamin A (retinol). Retinoids such as tretinoin are important regulators of cell reproduction, proliferation, and differentiation and are used to treat acne and photodamaged skin and to manage keratinization disorders such as ichthyosis and keratosis follicularis. (Not in 1st aid)
- 3. C- Leukotrienes –** Increase Bronchial tone. Causes anaphylaxis and bronchial asthma. FA 2012 429
- 4. E- Stimulating T lymphocytes-** IL-2's function is to stimulate the growth of helper and cytotoxic T-cells. FA 2012 230
- 5. D- Normal Pressure hydrocephalus-** Appears as wet, wobbly and wacky. Does not result in increased subarachnoid space but an expansion of ventricles distorts the fibers of radiate and leads to dementia, ataxia, and urinary incontinence. FA 2012 448
- 6. A- Atropine-** He has cholinesterase inhibitor poisoning which causes Diarrhea, Urination, Miosis, Bronchospasm, Bradycardia, Excitation of skeletal muscles and CNS, Lacrimation, Sweating and Salivation. Antidote is Atropine + pralidoxime (to regenerate AchE.) FA 2012 265



- 7. D- Oxygen-** (it should actually read for Gamma chains since there are no beta chains in fetal hemoglobin) but the difference between fetal hemoglobin & adult hemoglobin is the Gamma v Beta subunit the alpha chain is the same, and fetal hemoglobin has a higher affinity for O₂ and a lower affinity for 2,3-BPG. However this will also make releasing O₂ more difficult. **FA 2012 562**
- 8. F- Pneumocystis jirovici (PCP)-** Recognized by disk shaped yeast forms of methamine silver staining of lung tissue. AIDS patients should be treated prophylactically when CD 4 count drops below 200. **FA 2012 174**
- 9. B- loss of heterozygosity-** Loss of heterozygosity (LOH) in a cell is the loss of normal function of one allele of a gene in which the other allele was already inactivated. This term is mostly used in the context of oncogenesis; after an inactivating mutation in one allele of a tumor suppressor gene occurs in the parent's germ line cell, it is passed on to the zygote resulting in an offspring that is heterozygous for that allele. In oncology, loss of heterozygosity occurs when the remaining functional allele in a somatic cell of the offspring becomes inactivated by mutation. This could cause a normal tumor suppressor to no longer be produced which could result in tumorigenesis. (Not in FA) **Wiki**
- 10. E- VIP-** Increases water and electrolyte secretion, and relaxes the intestinal smooth muscles and sphincters. It is increased by the parasympathetic nervous system and abdominal distention, and inhibited by the sympathetic nervous system. When the pt was dehydrated the sympathetic system was strongly activated but when it was controlled the parasympathetic kicked in. **FA 2012 346**
- 11. C- Struvite-** Staghorn calculi are often Struvite (Ammonium magnesium phosphate) and are more common in patients with recurrent UTIs. **FA 2012 519**
- 12. B- Coagulation necrosis-** This is the most common type of necrosis in the heart kidney and liver. **FA 2012 244**
- 13. D-Inhibition of Renin Release-** Renin is released in low renal arterial pressure and increases renal sympathetic discharge, but in this patient there is excessive fluid so renin will not be released. **FA 2012 511**
- 14. A- MHC Class 1-** These symptoms are particularly tied to HLA-B27 which has Psoriasis, Ankylosing spondylitis, IBD, and Reiter's Syndrome. **FA 2012 224**

15. **D- Gait Ataxia.** if you recognize that this is the cerebellum then the things managed by it are voluntary movement of extremities, balance, truncal coordination, and ataxia. **FA 2012 437**
16. **D- Hypertrophy of the pyloric sphincter-** It is non-billious and therefore must occur before the duodenum, additionally rapid peristalsis is occurring so food must not be reaching the small intestine increasing Motilin. **FA 2012 246**
17. **B- DNA Gyrase-** Cipro is a fluoroquinolone which act by inhibiting DNA gyrase. **FA 2012 211**
18. **C- Omeprazole-** This is a classic presentation of GERD, and omeprazole is the first line med for GERD. **FA 2012 351**
19. **C- Elongation Factor 2-** This is a classic presentation of C. diphtheria which acts to inactivate Elongation factor 2. **FA 2012 152**
20. **B- Informed Consent-** A physician is required to provide: discussion of pertinent information, including giving the patient an intelligent understanding of the risks and benefits and alternatives. **FA 2012 59**
21. **C- Nitric Oxide-** Nitric oxide is the only specific therapy shown to reduce pulmonary vascular resistance. The reviewers for the Cochrane Library identified twelve RCTs evaluating the use of nitric oxide in term infants. They concluded "on the evidence presently available, it appears reasonable to use inhaled nitric oxide in an initial concentration of 20 parts per million for term and near term infants with hypoxic respiratory failure who do not have a diaphragmatic hernia". **(not in FA) From Neonatal Handbook**
22. **B- Aseptic Necrosis-** This is a known complication to corticosteroids **(not in FA) from WebMD**
23. **A- Type I-** Wheal and flare are associated with type I they also are the fastest to respond. **FA 2012 233**
24. **F- Uterine Relation-** Beta 2 stimulation increases insulin release and decreases the uterine tone **FA 2012 263**

25. C- Decrease permeability of Na^+ - we should know that bupivacaine is an amide local anesthetic and they act by binding to Na^+ channels and block Na^+ . FA 2012 477

26.E. Thyroglossal duct: cyst in midline neck and will move with swallowing (vs. persistent cervical sinus leading to branchial cleft cyst in the lateral neck). FA.2012, P.138

27.C. Lymph node involvement by cells originating in the lesion: The stage has more prognostic value. T- Tumor Size, size is not a factor in staging unless the cancer is invasive, N- Node Involvement, M- Metastases.

28.A. Disproportionate fear of serious disease: Hypochondriasis- preoccupation with and fear of having a serious illness despite medical evaluation and reassurance. FA.2012,P.491

29.C. Orlistat (Xenical)- is a selective gastric and pancreatic lipase inhibitor that reduces the absorption of dietary fat (which is then excreted in stool). The principal adverse effects oily stool, flatulence with discharge, and fecal urgency. **Sibutramine (Meridia)** is a Beta-phenylethylamine that inhibits the reuptake of serotonin and NE, for weight loss and the maintenance of weight loss. Kaplan & Saddock's Synopsis of Psychiatry 10TH, P.746

30.C. Squamous cell carcinoma: Risk factor- Cigarettes smoking. SCC-Upper 2/3 on the other hand you have Adenocarcinoma-Lower 1/3 (e.g. Barret's Esophagus). FA.2012, P.352

31.C. 0.2: 200 people ate lettuce. 40 people were sick, who ate lettuce. $40 / 200 = 0.2$. # of people who have diarrhea from lettuce / # of people who ate lettuce. SDN, Morsetlis

32.A. Aorta. Anatomy question

33.B. Decreased protein synthesis: Decreased protein synthesis. You're screwing up the 3' CCA sequence on the tRNA so you're not able to properly charge tRNA with amino acids. mRNA stability is normal, but translation is decreased. SDN, ijn.

34.B Pyelonephritis: UTI- Ascension to kidney results in pyelonephritis, which presents with fever, chills, flank pain, CVA tenderness, hematuria and WBC casts. Ten times more common in women (shorter urethras colonized by fecal flora.) FA.2012, P.197

35.G. Thyroid-stimulating hormone: Classic case of Hypothyroidism- Sign/Symptoms: Cold intolerance (dec. heat production), **Weight gain**, dec. appetite, Hypoactivity, lethargy, **fatigue**, weakness, **Constipation**, **dec.reflexes**, Myxedema (facial/ periorbital), **Dry**, cool skin; coarse, brittle hair, Bradycardia, dyspnea on exertion. FA.2012, P.325



36.B. Cardiovascular- In this type of questions you may want to pick the one that has the fastest impact in the population.

37.B. Dermatitis herpetiformis (DH). Celiac spruce autoantibodies to gluten (gliadin) in wheat and other grains. Proximal small bowel primarily. Associated with DH. FA. 2012, P.353

38.C. Hyperuricemia: Lesch- Nyhan syndrome- Defective purine salvage owing to absence of HGPRT, which converts hypoxanthine to IMP and guanine to GMP. Results in excess uric acid production and de novo purine synthesis. Findings: retardation, self mutilation, aggression, hyperurecemia, gout, choreoathetosis. FA-2012,P.70

39.E. Observational Cohort Study: Compares a group with a given exposure or risk factor to a group without. In the question they are comparing person with increase blood pressure vs. normal blood pressure. Can be prospective like in this case. It's related to Relative Risk (RR). FA.2012, P.52

40.C. Iron deficiency anemia: Microcytosis and hypochromia with manifestations of Plummer-Vinson syndrome (iron deficiency anemia, esophageal web, and atrophic glossitis, angular stomatitis, weakness. Associated with spoon nails or koilonychias). FA.2012, P. 380

41.A. Aortic Stenosis: Crescendo-decrescendo systolic ejection murmur following ejection click (EC; due to abrupt halting of valve leaflets). LV >> aortic pressure during systole. Radiates to carotid arteries/apex, Right second intercostal. Often due to age-related calcific aortic stenosis or bicuspid aortic valve. FA.2012, P.285

42.D. Ischium: Adductor Magnus-

- Proximal attachment: Adductor part: inferior ramus of pubis, ramus of ischium. Hamstring part: Ischial tuberosity.
- Distal attachment: Adductor part: gluteal tuberosity, linea aspera, medial supracondylar line. Hamstring part: adductor tubercle of femur.
- Main Actions: Adducts thigh; its adductor part also flexes thigh, and its hamstring part extends it. "Baby" Moore Essential Clinical Anatomy, 2nd ed. P.338

43.E. Superior oblique: Drooping eyelid is malfunction of either levator palpebrae superioris (motor of CN3) or tarsalis (sympathetic from superior cervical ganglion). Looking sideways is a "down and out" phenomenon from losing motor of CN3, letting CN6 and CN4 predominate. Large pupils is a loss of parasympathetic from CN3. Therefore, CN4 and CN6 muscles are still present: superior oblique and lateral rectus. SDN, Morsetlis

44.B . " Have you ever thought about quitting smoking?": Always used open ended questions to see what the patient thinks or what stage of change is he in. SDN,ijn

45.E. Suppression: Voluntary withholding of an idea or feeling from conscious awareness (vs. repression). E.g. Choosing not to think about the USMLE until the week of the exam. FA.2012, P.483

46.E. Ureter. Suspensory ligament of the ovaries: The ureter is at risk of injury during ligation of ovarian vessels in ovariectomy. Also acute hydronephrosis via ureter ligation would cause these symptoms. FA.2012, P.530

47.B. Dextrometorphan: from the options available this is the only one that works as a short-term cough suppressant. Codeine has antitussive potential but is an opiate as well as all the other options. Wikipedia

48.C. Defect in phagolysosome function: Chediak-Hegashi Syndrome: Patient has partial albinism and recurrent pyogenic infections. Clue: peripheral smear shows giant granules in the neutrophils. FA.2012, P.238

49.B. Release of Virus from infected epithelial cells. Patient has Influenza: normal function of neuraminidase antigen is to promote progeny virion release whereas hemagglutinin promotes viral entry. FA.2012, P.188

50.A. Autosomal Dominant: The patient has Acute Intermittent Porphyria. AD: structural genes defect. Both females and males affected. Often presents after puberty. FA.2012, P.89 (AIP)

BLOCK 4

1. (E) T-lymphocytes- Atypical lymphocytes seen on peripheral blood smear are not infected B cells but rather reactive cytotoxic T-cells. T-cells reacting to B-cells (Downey cells) cells with a funny cytoplasm. FA- 2010, P.166

2. (E) Interferes with translocation: Macrolides: Erythromycin- Inhibits protein synthesis by blocking translocation; binds to the 23sRNA of the 50s ribosomal subunit. FA2010, P.187

3. (B) Endothelium: Cell type: Mesenchyme-Blood vessels (endothelium) can turn into a benign hemangioma. FA2010, P.221

4. (E) Serotonin: Sumatriptan (Imitrex)- 5HT(1B/1D) agonist. Causes vasoconstriction, inhibition of trigeminal activation and vasoactive peptide release. Used: Acute Migraines and cluster headache attacks. FA2010, P.433

5. (C) Increases as prevalence Increases: PPV and NPV values are influenced by disease prevalence whereas specificity and sensitivity are not. FA.2010, P.53

6. (B) Difficulty swallowing: Amyotrophic lateral sclerosis: Pt. has both LMN and UMN signs. Sensory examination is normal. Present with a progressive weakness with

fasciculations eventually leading to muscle atrophy. The disorder is characterized by rapidly progressive weakness, muscle atrophy and fasciculations, spasticity, dysarthria, **dysphagia**, and respiratory compromise. Think of Stephen Hawking. FA.2010,P.407

7. (C) **Staphylococcus Aureus: Bacterial endocarditis from tunneled central vein catheter**, as a line may serve as a *porte d'entrée* (place of entry) for pathogenic organisms, and the line itself may become infected with organisms such as *Staphylococcus aureus* and coagulase-negative Staphylococci. **Wikipedia.**

8. (J) **Ventricular Septal Defect: Holosystolic, harsh-sounding murmur. Loudest at tricuspid area(over left sternal border 3rd & 4th intercostal).** FA.2010,p.255

9. (D) **Suspensory Ligament: Connects Ovaries to Lateral pelvic wall and contains the ovarian vessels. In the question stem it says decreased adnexal flow.** FA.2010, P.530

10. (C) **Examination of Stool for Ova and Parasites (O&P), Giardia lamblia-** Seen in campers/ hikers drinking from streams. Lakes contaminated by animal or human feces. FA.2010.p.161

11. (A) **Bevacizumab: is a drug that slows angiogenesis, the growth of new blood vessels. It is licensed to treat various cancers, including colorectal, lung, breast (outside the USA), glioblastoma (USA only), kidney and ovarian. Bevacizumab is a humanized monoclonal antibody that inhibits vascular endothelial growth factor A (VEGF-A).**[1] VEGF-A is a chemical signal that stimulates angiogenesis in a variety of diseases, especially in cancer. Bevacizumab was the first clinically available angiogenesis inhibitor in the United States. **Wikipedia**

12. (A) **Bromocriptine: Dopamine agonists inhibit prolactin secretion and can be used in the treatment of prolactinoma. Also Remember: Dopamine Antagonists (most antipsychotics) stimulate prolactin secretion.** FA.2010, P.286

13. (C) **Lambert Eaton Syndrome: Autoantibodies to presynaptic Ca²⁺ channel results in decrease Ach release leading to proximal muscle weakness.**

14. (C) All of the other answer choices are "self" proteins that are normally made by the body and thus will be poorly immunogenic. Only HPV/E6 is an example of a foreign antigen that will induce a vigorous immune response. SDN

15. (E) **Small intestine: Carcinoid tumor: Is a tumor of the neuroendocrine cells (5HT). Constitute 50% of small bowel tumors. Most common sites are the appendix, ileum, and rectum. Most commonly malignant in the small intestine. Classic symptoms: wheezing, right sided- heart murmurs, diarrhea, flushing.** FA.2010, P.324

16. (A) **Anterior to the sternocleidomastoid muscle:its a branchial cleft cyst .**

17. (C) **Inhibition of cytochrome P450 metabolism: Pt. related myalgia, gemfibrozil increased the blood concentrations of most statins by partially inhibiting the metabolism**

(or glucuronidation) of the statin acid byproduct. (Prueksaritanont T, Zhao JJ, Ma B, et al. Mechanistic studies on metabolic interactions between gemfibrozil and statins. J Pharmacol Exp Ther. 2002;301:1042-1051.)

18. (C) 25%:Autosomal recessive: Two carries parents affect 25% of offspring. FA.2010,P.85

19. (D) Iduronate sulfatase: Hunter's syndrome:Lysosomal Storage Disease: Accumulated substrate: Heparan sulfate and dermatan sulfate. Inheritance: XR. FA.2010, P.111

20. (F) Increase lactic acid concentration: Metformin most grave effect is lactic acidosis (contraindicated in renal failure). FA.2010, P.298

21. (D) Oxidative Phosphorylation: Mytochondrial Myopathies. FA.2010,P.85

22. (E) Proximal Tubule: Acute tubular necrosis (ATN):Ischemic ATN one of the most common cause of intrinsic renal failure in hospitalized patients. ATN renal ischemia triggers hypoxic changes in tubular epithelial cells(especially in proximal tubules and the thick ascending limb of loop of henle, decrease their functional capacity. Muddy brown cast or brown. Usmle World, FA2010, P.469

23.(A) Low-calorie: Dietary intervention focused on increased amounts of vegetables and reduced consumption of alcohol and simple sugars; overweight individuals (those with a BMI > 25 kg/m²) were encouraged to lose weight. ADA; 10.2337/diaclin.28.2.53 Clinical Diabetes March 31, 2010 vol. 28 no. 2 53-59

Table 3. Recommendations and Resources for Lifestyle Modification for Diabetes Prevention

General Recommendations for Lifestyle Modification for the Prevention of Diabetes

- Moderate-level physical activity (e.g., brisk walking) for at least 30 minutes per day, 5 days per week
- Weight-loss goals of 5–15% of starting weight, with target 1–2 lb weekly
- Limit fat content to < 30 % of total daily calories
- Reduce portion sizes and daily caloric intake
- Increase fruits, vegetables, and fiber in diet

24.(E) Carboxyhemoglobin: Form of hemoglobin bound to CO in place of O₂. Causes decrease oxygen-binding capacity with a left shift in the oxygen-hemoglobin dissociation curve. Thus decrease oxygen unloading to tissues. FA.2010, P.504

25. (A) Interleukin-1 (IL-1) An endogenous pyrogen. Causes fever, acute inflammation. Activates endothelium to express adhesion molecules; induces chemokine secretion to recruit leukocytes. FA. 2012. P.230

26. C: When viral RNA is translated into a polypeptide sequence, that sequence is assembled in a long chain that includes several individual proteins (reverse transcriptase, protease, integrase). Before these enzymes become functional, they must be cut from the longer polypeptide chain. Viral protease cuts the long chain into its individual enzyme components, which then facilitate the production of new viruses. Inhibition leads to a lack of a mature core. FA.2012 (p. 218).

27. B: The most common cause of struvite stones is infection with a urease-positive organisms such as *Proteus mirabilis*. It classically results in staghorn calculi in renal calyces, which act as a nidus for UTIs. FA 2012 (p. 198, 519).

28. B: Always advise a patient to discuss issues with his physician directly.

29. B: Graphesthesia could be caused by a lesion to the somatosensory cortex on the contralateral side.

30. C: Gynecomastia is a common condition in puberty and usually resolves with time. Drugs, Klinefelter's syndrome, or a testicular tumor could all cause gynecomastia but they are less likely. FA.2012 (p. 450)

31. A: In Myasthenia gravis, autoantibodies to postsynaptic AChR cause ptosis, diplopia, and general weakness. Symptoms worsen with use and reversal of symptoms occurs with AChE inhibitors. It is associated with thymic hyperplasia or thymoma. FA.2012 (p. 422)

32. C: Osteoporosis is caused by an imbalance between bone resorption and bone formation. Excess production of interleukins could result in the development of osteoporosis (an alternative name for IL-1 is osteoclast activating factor). Calcium, estrogen, and vitamin D would all help prevent osteoporosis. Monoclonal Ig is a characteristic of multiple myeloma, which frequently results in lytic, "punched-out" skeletal lesions. FA.2012 (p. 414)

33. E: As the day goes on patients with myasthenia gravis use their muscle more and the muscles tend to get weaker and weaker. As the disease progresses it can spread to the muscles used for respiration. FA.2012 (p. 422, 569)

34. D: Common causes of noncaseating granulomas include sarcoidosis, reaction to foreign material, beryllium exposure. Caseating granulomas are characteristic of TB and fungal infections. Asbestosis leads to fibrosis of lung and pleura with increased risk for lung carcinoma and mesothelioma. Pneumocystis jirovecii causes diffuse interstitial pneumonia. FA.2012 (p. 171, 174, 569)

35. C: Insulin is important to activating lipoprotein lipase and uptake of fat into the peripheral adipose tissues. If you're resistant to insulin then your triglyceride levels are high. HDL ("good cholesterol") is decreased in unhealthy metabolic states.

36. C: Thyroxine-binding globulin (TBG) binds most T3/T4 in the blood; only free hormone is active. T3 and T4 act on a nuclear steroid receptor. FA.2012 (p. 321-2)

37. A: Gilbert syndrome is caused by mildly decreased UDP-gluconoryl transferase or decreased bilirubin uptake. It is usually asymptomatic and results in elevated unconjugated bilirubin without overt hemolysis. FA.2012 (p. 363)

38. F: Mucormycosis is mostly in ketoacidotic diabetic and leukemic patients. Fungi proliferate in blood vessel walls when there is excess ketones and glucose, penetrate the cribriform plate, and enter the brain resulting in rhinocerebral and frontal lobe abscesses. This causes headache, facial pain, black necrotic eschar on the face, and may have CN involvement. FA.2012 (p. 173)

39. E: Rheumatoid arthritis classically presents with bilateral morning stiffness lasting >30 minutes that improves with use. It is an autoimmune disorder affecting synovial joints, with pannus formation in joints (MCP, PIP), subcutaneous rheumatoid nodules, ulnar deviation, subluxation, and Baker's cyst (behind the knee). Septic arthritis, gout/pseudogout, and osteoarthritis are not bilateral FA.2012 (p. 418)

40. A: Type II (β) error states that there is not an effect or difference when one does exist. Power = $(1 - \beta)$. Since the power of Trial X is smaller, β must be larger. (Trial X: $\beta = .2$; Trial Y: $\beta = .1$) FA.2012 (p. 57)

41 Correct answer is D. Decreased vision and milky opacity of the lenses in a diabetic patient suggest the development of cataract. In case of hyperglycemia, cells metabolize the excessive glucose into sorbitol through aldose reductase, and then sorbitol to fructose through sorbitol dehydrogenase. Some cells like those of retina and lens, lack the enzyme sorbitol dehydrogenase, this will lead to an accumulation of sorbitol into the cells, and osmotic damage.

42 Correct answer is E. The history suggest vaso-occlusive crises (probably chest pain syndrome) on a patient with sickle cell anemia diagnosis of which is also supported by the leaf shaped RBCs seen on the blood smear and positive family history. Sickle cell anemia is caused by a point mutation on the sixth codon of the B globin chains, resulting in a substitution of glutamate residue with a valine residue, this in turn will alter the physicochemical properties of Hb which will polymerize under hypoxic condition.

43 Correct answer is B. Orthostatic hypotension can be caused mainly by two reasons hypovolemia and blood pooling into the veins of the legs and trunk, the latter is prevented by the baroreceptor reflex (autonomic neuropathy and drugs may abolish it). In case of high-altitude sickness anhydrase inhibitors like acetazolamide are used to help acclimatization, which although considered weak diuretics if used for a prolonged time can lead to hypovolemia and hypotension.

44 Correct answer is B. After a gene is transcribed, a primary transcript is formed called pre-mRNA. At the end of the molecule there is an AATAAA sequence, that forms a



portion of the recognition signal for endonucleolytic cleavage and polyadenylation (addition of approx. 200 As), the latter will protect the molecule from degradation and aid the transport to the cytoplasm. So this point mutation will affect the cleavage and polyadenylation, which ultimately will lead to a decrease in the β globin chain and thalassemia

46 Correct answer is B. Blisters that rupture easily, preceded by oral ulcers, and that are of intraepidermal origin are characteristics of pemphigus vulgaris. PV is an autoimmune disease where autoantibodies against desmoglein 1 and desmoglein 2 are formed, Dsg1 and Dsg2 are normal components of desmosomes which link together the squamous cells of the epidermis.

45 Correct answer is E. Severe nausea and vomiting, uterus too large for the gestational age and increased levels of hCG (way too high from those of a normal pregnancy) suggest an hydatidiforme mole, which is part of a spectrum of diseases known as Gestational trophoblastic disease. GTD take their origin from proliferation of placental tissue (trophoblast) and encompasses hydatidiforme mole (complete or partial), invasive mole and choriocarcinoma.

47 Correct answer is B. Approximately one-third of stroke survivors experience major depression

48 Correct answer is C. Glycoprotein IIb/IIIa receptors, after changing conformation due to PLT activation, bind fibrinogen, which link them together resulting in aggregation. These receptors are inhibited by Abciximab, can be deficient in Glanzmann's thrombasthenia and, antibodies targeting them are formed in idiopathic thrombocytopenic purpura.

49 Correct answer is B. Glucagon and Epinephrine act on the different receptors but both involve the cAMP pathway, at the end of which glycogen phosphorylase will be activated and glycogenolysis will ensue.

If you will like to volunteer or submit any errors.

Go to feedurbrain forum, to the following thread:

<http://www.feedurbrain.com/forum/showthread.php?37284-Nbme-s-answer-with-explanation-step1&p=189384#post189384>